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DO MAGNETIC IONS EXIST?

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THE QUANTUM YIELD OF THE OXYGEN PRODUCTION OF ILLUMINATED CHLOROPLASTS SUSPENDED IN A SOLUTION CONTAINING FERRIC OXALATE

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ABSTRACT

Since the discovery of the evolution of oxygen by cell-free illuminated chloroplasts by Hill in 1937 much interest has been shown in this reaction to ascertain whether or not it is a part of the photosynthetic reaction proper. If one could find under controlled conditions, a quantum yield for this reaction consistent with the findings of Emerson and Lewis of California, and Stauffer, Duggar, and Daniels, of Wisconsin on algal photosynthesis, one could establish another similarity of this reaction to the photosynthetic reaction in intact green plants.

The light used in this study came from a 110 volt, 1000 watt tungsten projection bulb run at 8.0 amperes by means of a voltage regulator. This light was filtered through a water filter three meters in length and a corning RG 5 filter to give a band of light from 660 to 720 mμ. This light was focussed, with the aid of a lens and mirror system, on the bottom of a manometric vessel in a water thermostat with a controlled temperature of 10.000° C. ±0.005°. The manometer was the differential type, so that one vessel could be illuminated and the other serve as the dark control vessel. The chloroplast suspension, prepared from macerated spinach leaves, was mixed with Hill solution consisting of sucrose, potassium ferricyanide, po-

tassium oxalate, ferric ammonium sulfate, and a sorbitol borate buffer adjusted to pH 6.5. This mixture was placed in the main well of the vessel, while 0.5 ml. of a 10 per cent solution of sodium hydroxide was placed in the side arm to absorb carbon dioxide. The pressure of the oxygen released was converted to cmm. by the manometric constants. The light energy incident upon the vessel, which was usually about 3.0 x 10^{-3} cals./cm^2/min. was corrected for the fraction of light reflected and transmitted by enclosing the vessel in a reflecting sphere and measuring the Ix/Io ratio with a photoelectric cell and galvanometer. The amount of light hitting the vessel in the thermostat was determined by using a dipping photronic cell which was calibrated in absolute energy units with a thermopile, a U. S. Bureau of Standards lamp and galvanometer. The latter set-up also afforded an average energy measurement for the band of light used. Quantum yields for this energy value were found between 12 and 60 quanta per molecule of oxygen evolved. We consider the most likely value to be about 12-20, and that the lower efficiencies are due to the use of some spinach that had lost much of its activity.

Although these measurements are only preliminary and are not conclusive enough to fix the Hill reaction as part of the photosynthetic reaction proper, the measurements made so far indicate that it may be a part of that reaction which is known to require about ten quanta per molecule.

A COMPARISON OF CHEMICAL, PETROGRAPHIC, AND SPECTROGRAPHIC METHODS FOR THE ANALYSIS OF SILICATE ROCKS

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ABSTRACT

The Lundegårdh flame technique was used for an analysis of a granite and the results were compared with the standard chemical and petrographic methods. The spectographic method proved satisfactory for the determination of Fe_2O_3, Na_2O, K_2O, and MgO but accurate results were not obtained for CaO because of interference by the aluminum, SiO_2 and Al_2O_3 were not determined because of their high excitation potentials. The agreement between the petrographic and chemical methods was good.

X-RAY SPECTROSCOPY OF THE SOLID STATE*

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*Much of the material presented has been published in the Physical Review *58:* 213–218, 1940.

Science Education

TEACHING ELEMENTARY ASTONOMY: SOME CLASS ROOM EXPERIENCES WITH WIRE MODELS

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ABSTRACT

Wire models have been made to facilitate the visualization and understanding of fundamental conceptions in Astronomy and Navigation. The wire models cover the following topics:

1) Coordinate Systems (Horizontal, Equatorial, Ecliptic, Galactic Coordinate System) and their mutual transformation.
2) Projections used in star mapping.
3) Constellations and positions of heavenly bodies of main interest.
4) Apparent orbits of the Sun and some planets.
5) Seasonal Constellations.
6) Position of heavenly bodies at a given time.
7) Our Solar System.

STUDY OUTLINE OF METALS IN THE WAR

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The purpose of this study is to survey the metals which are critically important in the war. In a time when war machines from bullets to battleships are built of metals, civilians are often unaware of the reason for scarce metal articles on the home front. We hear that some metal is "needed for the war" or that "foreign supplies have been cut off." This study should show us what the specific needs and shortages are.

About twenty metals are in major use, either as pure metals or alloys. The following are important:

A. Iron & Ferroalloy group
1. Iron
2. Chromium
3. Cobalt
4. Columbium
5. Manganese
6. Molybdenum
7. Nickel
8. Tantalum
9. Titanium
10. Tungsten
11. Vanadium
12. Zirconium

B. Non-ferrous Metals
1. Aluminum
2. Antimony
3. Bismuth
4. Copper
5. Lead
6. Magnesium
7. Mercury
8. Tin
9. Zinc

SUGGESTED STUDY QUESTIONS

Iron and Ferroalloy Group

1. Why is the collection of scrap iron always important, and especially so in war time?
2. What metal ore supplies have been cut off by the war? From what places were they formerly obtained? What are we doing to meet the demands?
3. Which steel process is fastest? What are its drawbacks? What are the advantages and uses of each of the steel manufacturing processes?
4. What metals are needed for armor plate? What are the sources of the ore?
5. Why is managanese important in making steel? What was the pre-war source? Where is it now obtained?
6. What properties does tungsten give steel? What was the pre-war source? Where is it now obtained?
7. A certain text (1940 edition) states: — "there are no practical uses of columbium." What are some of the present uses?
8. What is the use of alloys with high magnetic retentivity? What are the names and compositions?
9. Which of the metals listed in the ferroalloy group are abundant in the earth's crust and which are rare? Comment on the possibilities for post-war use.
10. Make a table of steels and alloys, composition, properties and uses.
11. It has been stated that we are rapidly using up our high grade iron ore reserves during the war. What significance does this have for post-war industry?
12. Which of those ores may be obtained from foreign countries in the post-war period, and what are the probable sources of supply?

SUGGESTED STUDY QUESTIONS

Non-ferrous Metals

1. Why was submarine warfare a serious threat to the aluminum supply early in the war?
2. What western power development holds promise for post-war aluminum production? What may be the source of the ore?
3. Why was an aluminum scrap drive conducted early in the war?
4. What metals or ores is Germany able to obtain from occupied countries?
5. Holland was the center of a synthetic jewel industry. How did this affect our production of electric meters, etc. early in the war? From what materials are these jewels made?
6. What is the use of low melting alloys? Give names and compositions.
7. What is the reason for the collection of tin cans? How is tin recovered?
8. What is the composition of brass? What are its important war uses?
9. Make a list of articles in your home made from copper and its alloys.
10. What important paint pigment is made from lead? Look up the process of manufacture.
11. What is the use of babbitt? What does it contain?
12. What metal supply was cut off when Japan conquered the South Pacific? What is our present source of this metal?
13. Which of these ores may be obtained from abroad in the post-war period, and what are the probable sources?

The complete study outline gives the source, ore, metallurgy and uses of each of the metals named. Also a complete bibliography where additional information may be found.

LISTENING AND THINKING IN FRESHMAN CHEMISTRY

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ABSTRACT

This study is based on the principle that the purpose of all education is to advance toward wisdom. It is believed that wisdom is attained through discipline of the mental powers, and that real learning is learning to think.

Science teachers must make the development of mental powers, especially the ability to think, a definite objective because it has

been found that these habits do not result concomitantly with the mastery of the content unless there has been a definite aim. Freshmen entering college possess a certain fund of knowledge and a certain ability but the majority have not been trained to listen and to think.

A study was made to arouse interest in listening and thinking and to develop facility in the use of these mental powers. Listening was stressed in the teaching of problems, formulas, equations, and laboratory work. To develop thinking the use of paper and pencil was recommended for summarizing sections, writing equations, writing out questions on the assignment, and listing problems as they arise. Semester reviews were centered around word-equations and mathematical problems. Results were evaluated by a system of testing in which the discussion type question was used during the study of a unit, and the objective type at the end of a unit. Procedures for developing power to listen and to think were incorporated in a laboratory manual which is now being used.

It is the plan to continue the study in observing the effectiveness of these methods in enabling students to go forward to more general discussion of theories and principles of chemistry.

GROWTH IN PUPIL UNDERSTANDING OF BASIC SCIENCE GENERALIZATIONS THROUGH THE FIRST NINE GRADES

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ABSTRACT*

The problem of this study was to investigate the differences in understanding of basic science principles among pupils of different grades in an elementary and junior high school. A list of basic principles was compiled by the investigator based upon the assumption that pupil questions could be asked about energy, matter in general, or living things, and that the generalizations by which the questions could be answered would deal with concepts of fundamental nature (definition, composition, variety), inter-relationship, time, and space, respectively. A list of forty-five generalizations resulted.

*Abstract of the The Growth in the Understanding of the Basic Concepts and Fundamental Generalizations of Natural Science of Pupils from the First through the Ninth Grades Inclusive, a thesis submitted to the graduate faculty of the University of Minnesota in partial fulfillment of the requirements for the degree of Master of Arts, August, 1942.

A test was compiled with one test exercise based on each concept. Each test exercise consisted of: 1 — description of a situation, 2 — choice of one possible outcome, 3 — choice of one principle explaining the outcome. One form of the test was constructed for junior high pupils, a second for intermediate grade pupils, and a third oral form for primary pupils. The test was presented to four college subject matter specialists with doctor's degrees for validation of its scientific accuracy. Reliability was examined by Hoyt's method of analysis of variance, and was found to range from 0.61 to 08.2 for the pupils tested.

The test was administered to the regularly enrolled pupils of the Bemidji Minnesota State Teachers College Laboratory School which had about twenty pupils per grade. Pupils came from rural and small city homes of varying socio-economic backgrounds, and were of slightly above mean normal intelligence. Science was taught throughout the school, in organized units in the elementary grades, one hour daily in the junior high school.

The results, when analyzed by the Welch test with Nayer's tables, indicated that within the respective levels the grades did not differ significantly in their variability. Analysis of variance indicated significantly different means among the grades, however. The differences between the means of adjacent grades were statistically significant in the junior high school, and also between the sixth and seventh grades, and the fourth and sixth grades. The line of means proved to be quite regular and apparently linear, rising from 3.73 for the first graders to 29.46 for the ninth graders.

By fields of science the pupil understanding seemed to rise smoothly for biology concepts, rather steeply beginning at the junior high school level for physics concepts, less regularly for chemistry and astronomy-physiography concepts. The pupils at all levels seemed to have an understanding of a proportionately greater number of biology concepts, followed by astronomy-physiography, physics, and chemistry, respectively. The median coefficient of correlation of mental age and test scores by grades was roughly 0.60. No sex differences were found.

This study is but one of many which should undoubtedly be made so that science education on the elementary school level can proceed upon the foundation of research rather than upon mere opinion in determining what pupils are able to understand at different grade levels.

A COMPARISON OF GROUND SCHOOL GRADES AND COLLEGE BACKGROUNDS OF NAVY V-5 STUDENTS

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ABSTRACT

Ever since the Civilian Pilot Training program, now called the War Training Service program, under the Civil Aeronautics Administration was established at our institution, in 1939, the question has arisen regarding what advantages students enrolled in these programs enjoyed because of one or more years of college background. This study was made in order to answer the above question in some degree at least.

The Navy V-5 men, at this institution, are Naval Aviation Cadets, who receive thirty hours of ground school work per week. They attend classes five hours per day, either in the morning or in the afternoon, and receive flight instruction the remainder of the day. The subjects taught in ground school include Civil Air Regulations, Aerology, Navigation, Aircraft Familiarization and Engines, Recognition, Communications, and Physical Training. The first four are considered academic subjects. The cadets who entered prior to April 1943 had no preliminary Navy training. Mathematics and Physics were also included in their ground school work. The cadets who entered in April 1943 as well as all subsequent classes came to us from the Naval Flight Preparatory Schools where they received preliminary training.

The Elementary Program, on which this study is based, is of eight weeks duration. After completion of the seventh week they are given government examinations over the academic subjects they have studied. These examinations are prepared by the Civil Aeronautics Administration and the Navy and are administered by the Resident Naval Officer and the Civil Aeronautics Administration Ground School Supervisor. No one who has any connection with the Ground School is given any information regarding the questions asked, or is permitted to see these examinations.

In Table I the average grades on the daily work include all of the academic subjects as well as Recognition, Communications, and Physical Training. The average grades on the government CAA-

TABLE I

AVERAGE GRADES

	No College	1 yr. College	2 yrs. College	3 yrs. College	4 yrs. College	All Students
Gov't Exams	3.11	3.2	3.2	3.29	3.04	3.11
Daily Work	3.23	3.31	3.49	3.34	3.48	3.37

Navy exams include the grades received in the academic subjects only. The Navy system of marking was used both in daily work and in examinations. A score of 4.0 is considered perfect and a score of 2.5 is just passing. It will be noted that the average grades on daily work were slightly higher than the government CAA-Navy examination grades. This may be due to the fact that the Physical Training grades for all these men were quite high. It is also noted that on the government examinations the men with four years of college background and the men with no college background received the lowest grades while the men with one, two, or three years of college work were about the same. The men with three years have a slight advantage. In their daily work the men with no college background again received the lowest grades while the men with two or four years of college received the highest scores.

TABLE II

Session Starting Date		Years of College					Total Number of Students
		0	1	2	3	4	
43–E	1–15–43	11	7	1	..	..	19
43–F	2–13–43	3	3	1	..	1	8
43–G	3–13–43	5	3	5	1	..	14
43–H	4–16–43	31	6	1	..	..	38
43–I	5–13–43	20	4	..	..	..	24
43–J	6–11–43	25	..	1	..	..	26
44–A	7– 9–43	15	4	1	..	..	20
44–B	8– 6–43	14	4	..	..	..	18
44–C	9– 3–43	18	2	2	1	..	23
44–D	10– 1–43	23	2	6	1	..	32
44–E	10–28–43	22	3	4	2	2	33
44–F	11–26–43	1	7	5	6	4	23
44–G	12–12–43	8	12	4	..	..	24
44–H	1–21–44	2	5	6	1	2	16
44–I	2–16–44	9	8	4	2	..	23
Totals		207	70	41	14	9	Grand Total 341
% of total students		60.8	20.5	12	4.1	2.6	

Table II shows that approximately 60.8% of the cadets had no college background, 20.5% had one year of college, 12% two years of college, 4.1% three years of college and 2.6% four years of college background.

TABLE III

STUDENTS DISCONTINUED FOR FLIGHT INAPTITUDE

	No College	1 yr. College	2 yrs. College	3 yrs. College	4 yrs. College	Total Students
	6	6	3	0	1	16
% of total.....	37.5	37.5	18.75	....	6.25	= 100%
Average Age	20.3	21.3	21.6	....	23	

During the period studied 16 students were discontinued for flight inaptitude. An effort was made to determine whether age was a contributing factor. Table III shows the average age of these students. It was found that the average age of the six cadets who had no college background was 20.3 years, the average age of the six cadets who had had one year of college background 21.3 years, the average age of the three cadets who had two years of college background 21.6 years, and the average age of the one cadet who had had four years of college training was 23 years. None of the men with three years of college training was discontinued for flight inaptitude.

From this study it is apparent that the college background of these students did not contribute to their success as based on their average grades. This may be due to the fact that the ground school subjects studied were specifically designed to give these men definite training in the field of Aviation. The results also show that the average grades for all the students were very nearly the same. This may be reasonably explained, since weak students were given much additional help and encouragement in order to receive passing grades. Age did not seem to play an important part in the students' ability to acquire flying skill.

Social Science

THE IMPACT OF THE WAR ON RED WING, MINN.*

ECONOMIC ASPECTS

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ABSTRACT

The present study of a single community was undertaken with three main objectives in mind, namely:

1. The development of techniques and methods of measurements of those economic impacts of the war upon which post-war plans must be based.
2. The stimulation of cooperative study of economic problems in the community.
3. The analysis of specific information of direct use in shaping community plans.

The techniques used were mainly of three types. Census data were analyzed; accounts and records of individual companies were gathered and forecasts of employment made; questionnaires were used for information on post-war purchasing and other plans.

The findings, which apply to Red Wing only, include evidences of little or no unemployment immediately after the war; anticipated post-war expenditures of nearly three million dollars on durable consumers' goods including 300 new houses, 1800 new automobiles, 2300 new refrigerators, and so on, with income and savings sufficient to pay for them; and a considerable volume of deferred public works for which plans are being prepared. These latter should be useful in balancing employment and the labor force.

* * *

THE EFFECT OF THE WAR ON SOCIAL ORGANIZATION OF RED WING, MINNESOTA

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ABSTRACT

This is a study of the social structure of the people of Red Wing described in terms of education, income, occupation, participation

*A series of reports has been published by the University of Minnesota Press under the title The Community Basis for Postwar Planning, Nos. 1–11, 1944–1946.

in civil organizations, and the attitudes of these people towards war-time rationing programs. A random sample of 333 households was visited by a group of volunteer visitors who were given brief instructions. The sample was checked for representativeness on the basis of area, income distribution and occupational distribution, and found to be a reliable sample. The information was obtained by interview, usually with the housewife. Three schedules were used, which had been pre-tested in the field in advance by a trained worker. The chief results of a *preliminary analysis* of the returns show: there were changes in the occupational distribution of employed persons from the distribution of the 1940 census — a decline in the proportion of persons in the professional and managerial classes, an increase of those who were proprietors and managers, a decrease in sales and clerical occupations, an increase in skilled workers and craftsmen, and in semi-skilled and factory operatives, and a decline in service, personal, unskilled and day laborers. These are shifts which are to be expected in war time. Ten questions on opinions toward war time rationing were asked: a large majority thought that the rationing program was justified, a considerable majority thought that after the war the rationing program should be gradually tailed-off, a majority thought that the administration of rationing was not unfair and not uneven, most people favored administration by local volunteer boards or local officials rather than by paid federal officials, and a very large majority did not know of the existence of black markets. Since the response to any question could be "Yes," "No" or "Undecided," it is interesting to find out the characteristics of those who were undecided of opinion, in order to evaluate the majority opinions. Here the information about education, income, occupation and group participation, supplied interesting explanation. It appears that those with undecided opinions about such an important a matter as war time rationing were in general of lower socio-economic status than were those of decisive opinion. The incomes of those who were undecided were considerably lower than the average income of $1910 per annum per family for the entire sample, and still lower than those who held decided opinions. There was also evidence that those with undecided opinions had somewhat less education, were in lower and less skilled occupations, and were less active in the groups and social organizations of the community, than those with decided opinions. In general, the social structure of the community seemed stable and on a par with normal community structure.

JUVENILE DELINQUENCY

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LISTENER AND READER INTEREST

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ABSTRACT

Red Wing is an example of a one-paper city. Since 1941 it has been one of the increasing number of cities in the United States in which readers must depend for local news on a single newspaper.

The purpose of our survey is to attempt an appraisal of listener and newspaper reader habits in Red Wing, and to attempt if possible to correlate our findings with some of those revealed by other participants in the community study.

Professor Thomas F. Barnhart is undertaking a study of the circulation, advertising, and management of the Red Wing *Republican-Eagle*. His findings will doubtless show, among other matters, that the very fact of newsprint and manpower shortage is affecting seriously the contents of the *Republican-Eagle*. Mr. Albert Marshall, Jr., publisher, has for two years been in the army. Mr. L. J. Nash, the manager, is attempting to get along with a few employees. Mr. Elmer Olson, managing editor, is virtually a one-man news staff. He supervises the news and editorial staff, writes the editorials, edits all of the telegraph news, edits the feature material, and handles the make-up of the pages. He has only one experienced assistant, who doubles as a reporter and local copy reader. Two young girls, inexperienced, handle society and personal items. Mr. Olson's son, a high school boy, helps his father too. That's the staff.

Our survey of listener and reader interest is made up of three parts. First, we are attempting an analysis of the newspaper's contents, for 1939 and 1943. We set up a classification of newspaper content, which we hope will be meaningful. We are using a sample of 24 issues for each of the two years. Each month is represented by two issues, and the days of the week were selected in succession, so that each of the six days of issue is represented four times during the year and once each season.

Secondly, this week we have made the second survey of an issue of the *Republican-Eagle,* and we hope to get about 250 completed interviews. The survey was made during the evening and the next forenoon of the day of publication of the issue.

Since the circulation of the *Republican-Eagle* reaches more than 90% of the homes in Red Wing, and the population in terms of economic levels appears to be quite evenly distributed throughout

the city, we used a random sample of the city by allocating each interviewer to a series of blocks in the city.

The interviewers were instructed to present an unmarked copy of the newspaper to each respondent and to record what the reader was sure he had read in the paper. Page by page the respondent was asked to notice each item and to say whether he had seen it, read it, and how much of it he had read. The method followed the procedures which George Gallup, the Continuing Study of Newspaper Reading, the Clark Company, the Curtis Publishing Company, and others have found over a period of years to result in the best estimate of readership among the various techniques which have been used to date.

Thirdly, each person who was solicited in the readership study was asked a number of questions about his reading and radio listening habits. Because of technical difficulties, which included the small size of the city, it was not found feasible to conduct a telephone survey on radio listenership. The second choice of methods was, therefore, a personal interview during which the respondents were questioned about listener habits and preferences. They were also presented with a card bearing the radio programs of stations heard in Red Wing, and asked to state what programs of the previous day they were sure they had listened to.

We have not yet completed tabulation of the results of these surveys or the study of the sample which we obtained. We are hopeful that the study will provide us with meaningful results and with interesting experimental data on our methods.

ART ON MAIN STREET

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ABSTRACT

There is little of what one would call a direct impact of the war on the public art of Main Street. Yet, in view of the extensive readjustments that are now being planned for the post-war period, it is well to review the cultural resources of the community both as to their utilization in the past and their possibilities in the future.

So far there have been few systematic investigations of this type on the function of art in the local community except for occasional side remarks in social studies of the Middletown variety. From the modest beginning we have made in Red Wing it seems to me the possibilities for an inventory and clarification of many cultural problems are unlimited. The following observations made at different times during the fall and winter of 1943–4 will give a brief idea of what we are doing.

An extraordinarily well designed window display was noted in one of the local department stores. I found that the designer was one of the younger clerks of the store, a son of a house painter from the northern part of the state, who did this work, as well as some water colors of his own, as a mere hobby. The local librarian told me this boy was one of her most frequent users of art books in the city library. In my opinion these window designs would compete favorably with the best in the Twin Cities and I feel with certainty that this is but one example of an extensive creative talent available in Red Wing.

On Main Street there are a number of fine old buildings built of local stone, well preserved and pleasing to look at. Others were once as genuine and attractive but have been cut down or "remodelled" so that they now stand out as fearful eyesores that mar the artistic appearance of the town.

Red Wing has a number of fine, well preserved homes that reveal a series of distinctive styles that make up the architectural history of this community from the early 1860's to the present. To any out of town visitor these are impressive monuments which belong to the most important cultural assets of the town.

Another valuable asset of the town as a whole is the characteristic care and effort put into its lawns, flower gardens, and general landscaping around the homes of its citizens. This is a tribute both to the natural beauty of the city's surroundings and to the vigorous local membership (one of the largest in the state) of the state Horticultural Society.

The artistic products of some of its local industries, such as the Pottery, show most of the characteristics that are standard all over America, but also show many designs that are unique and genuinely expressive of the local region.

There is much more to be described, but these few remarks might suggest how the future planning of the community might make use of its Main Street art.

Recent Changes in the Schools

OUT OF SCHOOL YOUTH IN RED WING

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ABSTRACT

The purpose of this investigation was to study the effect of the war upon the educational and vocational activities of youth who had left the public schools of Red Wing, Minnesota. The population included in the study were of two types, those who had graduated from high school and those who had left the schools before graduation.

A prewar sample of youth was obtained by securing from the school census the names of all youth who either left or graduated from the schools between September first and August thirty-first during the years 1936–1937 and 1939–1940. A list similarly obtained for the year 1942–1943 provided a sample of youth since the war began.

Data concerning age, intelligence, scholarship, and similar factors were obtained directly from the school records. Information concerning employment was obtained by personal interviews in the homes of a sample of youth of both types of the population for all three years.

The evidence indicates that these youth were quite normal groups of graduates and eliminants. The war had had no effect upon the number of graduates but the number of eliminants had doubled. The major portion of this increase came from grades 9 to 11. In 1942–43 "going to work" was named for the first time as a cause for school leaving; 22% offered this reason. Less than 10% of the boys left school to enlist in the armed forces.

The proportion of elimination caused by removal of the family from Red Wing remained constant at about 50% in all three years. The pupils whose families left the city on the average were one year younger, left school one grade earlier, and were of higher intelligence than those whose families remained in the city. Only 13% of the families of the graduates left the city. This ratio was fairly constant for all three years.

About 80% of the male graduates of the prewar years and 65% of those of the war year were in the armed forces by March 1, 1944. The proportions for the eliminants were about 75% of the prewar groups and 60% of the war year group. Only three females, all prewar graduates, had entered any of the women's services in the armed forces.

The war has decreased the proportion of graduates entering col-

lege from about 20% of both sexes in the prewar years to none of the boys and about 15% of the girls of the class of 1942–43. In addition about 4% of the girls entered schools for nurses and about 10% of the boys who had not previously entered college have been sent to some college by the armed forces for special education. Only 2% of the graduates entered other types of education, such as business or trade schools. None of the eliminants have had any college education and less than 1% have pursued any other type of further education.

The graduates of both sexes entered occupations of a markedly higher level and remuneration than the eliminants. Only one of the female graduates reported no employment as contrasted to 2% of the female eliminants. About 50% of the male eliminants of 1939–40 and 1942–43 reported no regular employment while only 20% of the male graduates were not employed, almost all from the class of 1943. The lack of regular employment of these boys is probably related to their status in the draft, but the differences in the proportions of eliminants and graduates unemployed is marked.

The findings of this study indicate that there have been marked changes in such matters as the number of eliminants from the school, the amount of elimination caused by removal of the family from the city, the disruption of normal life plans and activities caused by induction into the armed forces, and in unemployment of recent male graduates and eliminants. While a causal relationship between the war and all these changes has not been established, there is at least a strong presumption that they are the result of the impact of the war.

CURRICULUM AND INSTRUCTION

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ABSTRACT

Responsibility for the section of the educational division of the study of the effect of the war upon the community of Red Wing, Minnesota, devoted to the Curriculum, Instruction, and Outcomes of Instruction has been assigned to Dr. Leo J. Brueckner and me. I am to report to this body on that portion of our study devoted to the Curriculum and to Instruction.

A fivefold attack was made upon the possible influence of the war upon the curriculum. First, a survey was made of the changes in curriculum offerings covering the period 1940–41 to 1943–44. It was felt that a study of subjects added or dropped from the curriculum over this period would reflect the areas of changed emphasis due to the war. The major additions to the curriculum, as might be

expected, were found at the secondary level in the fields of mathematics and science. The elimination of such courses as French and Journalism further suggested a transfer of interest to those subjects more immediately important to the war effort. This assumption was borne out in the second phase of our study which involved the shifts in enrolment for the years 1940–41 to 1943–44. Over this period, mathematics gained approximately fifty per cent in enrolment, the fields of science and physical education each increased their enrolments about one third while the enrolments in industrial arts decreased about fifty per cent; journalism, art, and languages each sustained losses of approximately forty, twenty, and fifteen percent respectively.

A third approach to the problem was through a study of the impact of the war upon the content of the existing curriculum. Lists were developed for each subject area of items peculiar to these subjects, such as Radar in physics, Blood Plasma in biology, or Poison Gases in chemistry. Teachers were asked to indicate to what extent such items were considered in their courses. While teachers varied greatly in their alertness to the possible application of their subjects to the war effort, in general the content of their courses appeared to be influenced only slightly by the war.

A study of co-curricular (extra curricular) activities was made to determine to what extent these had been influenced by the war. Throughout the entire school system pupils appeared to participate actively in scrap drives such as tin and rubber collections, and bond and stamp sales. At the secondary level the addition of first aid, rifle, airplane, and radio clubs reflected the influence of the war on student interests.

Finally, the most consistent single war time influence upon the curriculum of the Red Wing Schools was found in the series of weekly newspapers of current events. Every pupil in the elementary and secondary divisions comes in contact with these newspapers each week. A careful analysis of the content of the weekly issues of these newspapers was made covering the first four months of the school year 1943–44. The content of these papers was found to give major emphasis to events and problems related to the war.

A study of the influence of the war upon instructional activities was made in a three fold manner. First, every elementary classroom and a majority of the classes in the junior-senior high school were visited. The investigators, whose visits and purpose of the visits were unannounced found that in four-fifths of the classes visited, no mention was made of the war. Careful notations were made of posters, clippings, pictures, and materials of any kind related to the war. In all rooms war bond and war stamp posters were found prominently displayed, but other materials of this nature were meagre. A third approach made to get a true reflection of the influence of the war upon instruction was to get the teachers to make

a written report of ways in which their instructional procedures had been influenced by the war.

It seems fair to conclude: (1) that on the whole the curriculum of the Red Wing Schools has been little affected by the war, (2) that the instructional activities of the teachers of Red Wing, with a few notable exceptions, have not been greatly influenced by the war.

INSTRUCTIONAL OUTCOMES AS AFFECTED BY THE IMPACT OF THE WAR

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ABSTRACT

The impact of the war on instructional outcomes in Red Wing has been studied in a variety of ways, including:

a. The health of the children as measured by absence due to illness.
b. Delinquency as measured by truancy as a cause of absence.
c. Rates of promotion at all levels of the school.
d. Knowledge of important war information as measured by a test.
e. Attitudes toward forty major social, economic, and political issues.
f. Consciousness of critical problems faced by our country in the postwar period.

As measured by absence due to illness there has been year by year since 1940 a steady increase in health problems at all levels of the school.

As measured by the amount of truancy the data gathered show that delinquency is a negligible factor in causing absences from school. In 1942–43 the percent of absence in the elementary school due to this cause was less than one percent.

Rates of promotion have not been affected by the impact of the war. In the past three years the percent of pupils promoted was over 97 percent in both elementary and high schools. This is a very high rate of promotion, much higher than is found in most places.

Tests of the knowledge the pupils have about many aspects of the war, such as special terms, kinds of weapons, plane identification, leaders, current issues, and geography of the war show that there is a gradual increase in the amount of information children have about these matters from grade 4 to grade 10. There is no increase in grades 11 and 12, rather a slight decrease. There is a very great variation in pupil scores at all grade levels. Some children in all grades rated very high while at all grade levels there were very

low scores. The latter results show that there are many children who apparently know little about the war. The scores made by the boys were significantly higher at all grade levels than the scores for the girls.

The test of pupil attitudes on forty major issues shows that there is little change in the attitudes of pupils from grade 4 to grade 12. This indicates a high degree of constancy in these attitudes from grade to grade. There is evidence that on certain issues their attitudes are quite similar to those of their parents. It thus appears that attitudes are likely to be conditioned more by forces outside the school than by the activities of the school. There is little difference in the attitudes of boys and girls. This was not true of war related knowledge.

An analysis of the problems listed by the pupils that they feel our nation must face in the future indicated that at all levels there is an awareness of critical issues that our people must deal with in the postwar period. The problems mentioned most frequently by the children were postwar employment, adequacy of our food supply, and our part in establishing an enduring peace. This body of information is of undoubted importance for those who are planning the curriculum of the schools, since it is a function of the school to make the pupils intelligent about these matters.